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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Jorkki Hyvonen

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EXAMINER

COLUCCI, MICHAEL C

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/520,171	Applicant(s) HYVONEN, JORKKI	
	Examiner Michael C. Colucci	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-15 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 8-15 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 8 and 15 have been considered but are moot in view of the new ground(s) of rejection.

In response to arguments (pages 4-5):

Argument (page 4 paragraph 6 - page 5 paragraph 2):

- “However, no length difference calculation is involved using an input symbol string as recited”

Examiner takes the position that neither Ballard (US 5377281 A) nor Jost (US 7043439) particularly teach a length difference calculation. A length difference calculation as taught in claims 8 and 15 is believed to be taught in the new reference Kwok (US 20020165873 A1), where a difference an edit distance is taught dependent on the number of characters.

Claim Rejections - 35 USC § 101

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 8-15 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 8 – 15 directly recite a mathematical algorithm by setting forth the steps of:

“creating a trie data structure of symbol strings”

“calculating at the calculation point also the smallest possible length difference”

“calculating on the basis of each distance and corresponding length difference
reference value”

“selecting repeatedly the next branch to follow to the calculation point indicated
by the next symbol”

These steps are mathematical in nature.

The claimed subject matter must contain more than 35 USC 101 judicial material, such as an application which involves the 101 subject matter. Particularly, there must be a result that is useful, tangible, and concrete. The claimed subject matter within claims 8-15 contains material that lack tangibility, where a real world result is produced. Examiner takes the position that the recited claims 8-15 are merely mathematical in nature, where the process of calculating a smallest possible difference of a string, does not produce a tangible result. Though the calculation step is repeated, a calculated value that is produced does not render a tangible or real-world result.

The claimed invention is directed to non-statutory subject matter. Claim 12 disclose a "computer program" with no description or clear support of a computer program product in the specification. Therefore, with no disclosure of a computer product within the specification, a computer program product can be interpreted as a computer program, which does not fall under one of the statutory categories under 35

USC 101 as patent eligible subject matter, where computer program or computer program product does not define any structural and functional interrelationships between the computer program and other claimed elements of a computer which permit the computer program's functionality to be realized

As per the claims, the language "A method for searching for an input symbol ...; and "an apparatus for searching for an input symbol" do not transform the claimed subject matter into statutory subject matter. The recital is merely a field of use or desired end use limitation. A mathematical algorithm is not made statutory by "attempting to limit the use of the formula to a particular technological environment." Diehr, 450 U.S. at 191, 209 USPQ at 10. Thus, "field of use" or "end of use" limitations in the claim preamble are insufficient to constitute a statutory process.

Claim 15 is written in means-plus-function format and for the purpose of this rejection is being treated as though it was a method claim. The courts have held that such treatment is acceptable:

"If the functionally-defined disclosed means and their equivalents are so broad that they encompass any and every means for performing the recited functions, the apparatus claim is an attempt to exalt form over substance since the claim is really to the method or series of functions itself. In computer-related inventions, the recited means often perform the functions of "number crunching" (solving mathematical algorithms and making calculations). In such cases the burden must be placed on the

applicant to demonstrate that the claim is truly drawn to specific apparatus distinct from other apparatus capable of performing the identical functions."

If this burden has not been discharged, the apparatus will be treated as if it were drawn to the method or process which encompasses all of the claimed "means." See In re Abele 214 USPQ 682, 688 (CCPA 1982); Ex parte Akamatsu, 22 USPQ 2d 1915, 1920; and Ex parte Alappat, 23 USPQ 2d 1340, 1344.

The specification does not disclose a specific hardware, software, or a combination thereof for performing the steps recited in claim 15.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ballard et al US 5377281 A (herein after Ballard) in view of Kwok et al. US 20020165873 A1 (hereinafter Kwok).

Re claims 8, 12, 13, and 15, Ballard teaches a method for searching for an input symbol string (col 7 line 60 – col 8 line 52) among a set of symbol strings, comprising: creating a trie data structure (Fig. 4 & col 7 line 10-36) of symbol strings, wherein the symbol strings are grouped into branches in such a manner that the symbol strings

beginning with the same symbols belong to the same branch (col 7 line 10-36), and the symbol strings in the same branch divide into new branches at the symbols (col 7 line 10-36), from which onwards the symbols strings differ from each other, receiving an input formed of an input symbol string, proceeding from the starting point of the trie data structure along a branch to a calculation point indicated by the next symbol (Fig. 4).

Calculating distances at the calculation point between a sample symbol string formed by the symbols of the calculation point of the branch in question and the calculation points preceding it and the input symbol string by comparing (col 7 line 60 – col 8 line 52) these in alternative ways (col 7 line 60 – col 8 line 52).

Selecting repeatedly the next branch to follow to the calculation point indicated by the next symbol (Fig. 6 & fig. 7), at which said calculation is repeated for the new calculation point (Fig. 6 & fig. 7), said selection of the next branch being performed in such a manner that next the routine (Fig. 6 & fig. 7) proceeds from the calculation point, from which the lowest reference value has been obtained as result (Ballard fig. 6 & fig. 7).

After the calculation has terminated (Fig. 6 and fig. 7), selecting one or more symbol strings (Fig. 6 and fig. 7) having the shortest distance (col 9 lines 46-68) to the input symbol string on the basis of the performed calculations, and using the selected symbol string(s) (Ballard col 7 line 60 – col 8 line 52) to produce a response (Ballard fig. 5)

However, Ballard fails to teach calculating at the calculation point also the smallest possible length difference (Kwok [0062]) corresponding to each distance that

indicates how much the length of the remaining part of the input symbol string not examined in the distance calculation differs from the lengths remaining in the symbols strings passing through the calculation point, and calculating on the basis of each distance and corresponding length difference a reference value (Kwok [0062]).

Kwok teaches an edit distance is a measure of "distance" between two words. It can be thought of as a measure of the similarity (or non-similarity) between two words. A simple measure of the edit distance is the number of characters that are different between two words. For example, the two words "cat" and "cot" differ in one character position, and the edit distance would therefore be one. Using this definition, a measure of edit difference could be determined through the following formula: (worst case edit distance-edit distance)/worst case edit distance. In the latter example, this is $(3-1)/3$, or $2/3$. Thus, as edit distance increases, the edit distance measure decreases.

Kwok also teaches an edit distance between a words "tame" and "lame" may be less than one, because it is likely that a writer simply did not cross the "t" in the word. Note that the edit distance measure in this case increases from that calculated in the example of the last paragraph. As another example, an edit distance between the words "man" and "can" may be larger than one, because it is unlikely that the characters "m" and "c" would be written in a confusingly similar manner.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention the smallest possible length difference indicating how much the length of the remaining part of the input symbol differs from the lengths remaining in the symbol strings. Calculating a difference between edit distances allows for the ranking of

the most probable data when comparing in input string to possible candidates in a trie, where various of a word can be discarded based on the edit distance and edit difference. Additionally, using a difference value can be used to further narrow a set of candidates through the use of probabilities such as the difference value divided by the worst possible difference present.

Re claim 9, Ballard teaches a method as claimed in claim 8, comprising comparing the distance of the symbol string or strings used to produce the response (Fig. 6 & fig. 7) and that of the input symbol string with a predefined maximum distance (col 8 line 30-41), and changing the produced response to indicate that the input symbol string was not found if the distance exceeds the maximum distance (Ballard col 8 line 30-41 & fig. 6 & fig. 7)

Re claim 10 and 14, Ballard teaches a method as claimed in claim 8, comprising when selecting the branch (col 7 line 10-36 & fig. 4), comparing said lowest reference value with the predefined maximum distance (Fig. 6 & fig. 7), and terminating the calculation if the lowest reference value exceeds the maximum distance (col 9 lines 46-68 Fig. 6 & fig. 7)

Re claim 11, Ballard teaches a method as claimed in claim 8, comprising when selecting the branch, checking whether calculation is already done for the last calculation point on one of the branches distance (fig. 6 & fig. 7), and terminating the

calculation, if it turns out that for the last calculation point of one of the branches a reference value has been obtained that is lower than the reference values obtained for all the other calculation points distance (col 9 lines 46-68 & fig. 6 & fig. 7)

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure US 7043439 B2, US 4400828 A, US 4284975 A, US 6985861 B2, US 6377945 B1, US 5655031 A, US 5799299 A, US 7092567 B2, US 20020099536 A1.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael C. Colucci whose telephone number is (571)-270-1847. The examiner can normally be reached on 9:30 am - 6:00 pm, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil can be reached on (571)-272-7602. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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